1. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 2x^3 + x^2 - 3x \text{ and } g(x) = -x^3 + 2x^2 - 3x$$

A. $(f \circ g)(1) \in [-8, -5]$

B. $(f \circ g)(1) \in [-8, -5]$

C. $(f \circ g)(1) \in [-3, 2]$

D. $(f \circ g)(1) \in [-16, -10]$

E. It is not possible to compose the two functions.

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2. Determine whether the function below is 1-1.

$$f(x) = 16x^2 - 80x + 100$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because the range of the function is not $(-\infty, \infty)$.

D. No, because there is a y-value that goes to 2 different x-values.

E. Yes, the function is 1-1.

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3. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-3x + 12} \text{ and } g(x) = 5x + 5$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-6.25, -2.25]$

B. The domain is all Real numbers except $x = a$, where $a \in [-6.4, 0.6]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [4, 6]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-7.8, -0.8]$ and $b \in [3.75, 7.75]$

E. The domain is all Real numbers.

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4. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x+4} - 2$$

A. $f^{-1}(8) \in [-0.66, -0.48]$

B. $f^{-1}(8) \in [6.02, 6.73]$

C. $f^{-1}(8) \in [-0.35, -0.08]$

D. $f^{-1}(8) \in [-1.75, -1.28]$

E. $f^{-1}(8) \in [0.38, 0.63]$

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5. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -12$ and choose the interval that $f^-1(-12)$ belongs to.

$$f(x) = 4x^2 - 3$$

A. $f^{-1}(-12) \in [3.32, 4.02]$

B. $f^{-1}(-12) \in [1.6, 2.66]$

C. $f^{-1}(-12) \in [5.18, 5.92]$

D. $f^{-1}(-12) \in [1.28, 1.69]$

E. The function is not invertible for all Real numbers.

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6. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = -2x^3 + 2x^2 + 3x - 1 \text{ and } g(x) = -x^3 + 2x^2 - 2x + 4$$

A. $(f \circ g)(1) \in [-7, 5]$

B. $(f \circ g)(1) \in [-28, -27]$

C. $(f \circ g)(1) \in [-14, -6]$

D. $(f \circ g)(1) \in [-26, -22]$

E. It is not possible to compose the two functions.

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7. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 5x^2 + 3x + 3 \text{ and } g(x) = 2x^4 + x^3 + 7x^2 + 8x + 9$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [3.5, 8.5]$

B. The domain is all Real numbers except $x = a$, where $a \in [4.8, 6.8]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-12.67, -5.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [4.2, 8.2]$ and $b \in [-10.6, -2.6]$

E. The domain is all Real numbers.

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8. Find the inverse of the function below. Then, evaluate the inverse at $x = 5$ and choose the interval that $f^-1(5)$ belongs to.

$$f(x) = e^{x+2} - 3$$

A. $f^{-1}(5) \in [-2.77, -1.99]$

B. $f^{-1}(5) \in [-1.09, -0.58]$

C. $f^{-1}(5) \in [-0.74, 0.63]$

D. $f^{-1}(5) \in [-1.97, -1.86]$

E. $f^{-1}(5) \in [3.78, 4.92]$

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9. Determine whether the function below is 1-1.

$$f(x) = 12x^2 - 114x + 252$$

A. No, because there is an x-value that goes to 2 different y-values.

B. No, because there is a y-value that goes to 2 different x-values.

C. Yes, the function is 1-1.

D. No, because the domain of the function is not $(-\infty, \infty)$.

E. No, because the range of the function is not $(-\infty, \infty)$.

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10. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -13$ and choose the interval that $f^-1(-13)$ belongs to.

$$f(x) = \sqrt[3]{5x + 4}$$

A. $f^{-1}(-13) \in [438.59, 439.36]$

B. $f^{-1}(-13) \in [-439.72, -437.92]$

C. $f^{-1}(-13) \in [-440.63, -439.67]$

D. $f^{-1}(-13) \in [439.31, 440.26]$

E. The function is not invertible for all Real numbers.
